The “word gap” and the role of resource scarcity

Psychology & Economics of Poverty Convening

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Talk With Me Baby: based on Hart & Risley, 1995

WORDS HEARD BY AGE 3

43 MILLION
Talk With Me Baby: based on Hart & Risley, 1995
By the age of 3, high-income children have double the vocabulary of low-income children.

Talk With Me Baby: based on Hart & Risley, 1995
In the mid 1900s...

- **Didactic conversations** (Milner, 1951)
- **Less engagement in rituals like mealtimes** (Milner, 1951)
- **More directives** (Bernstein, 1960; Bayley & Schaefer, 1960; Walters, Connor, & Zunich, 1964; Bee et al., 1969; Snow et al.; Nelson, 1973; Clarke-Stewart, 1973)
- ** Longer, less complex utterances** (Hess & Shipman, 1965; Bee et al., 1969)
- **Fewer elaborations/contingent responses** (Bernstein, 1961; Tulkin & Cohler, 1972; Ramey, Farran, & Campbell, 1978)
In the mid 1900s...

- Didactic conversations (Milner, 1951)
- Less engagement in rituals like mealtimes (Milner, 1951)
- Longer, less complex utterances (Hess & Shipman, 1965; Bee et al., 1969)
- Fewer elaborations/contingent responses (Bernstein, 1961; Tulkin & Cohler, 1972; Ramey, Farran, & Campbell, 1978)

More recently...

- Kelly et al., 1996
- Gilkerson et al., 2009
- Jarrett, Bahar, & Kirsh, 2016
- Ellwood-Lowe, Mastin, Marchman, & Fernald, under revision
- Hoff-Ginsberg, 1991
- Hart & Risley, 1995
- Hoff, 2003
- Rowe, 2012
- Romeo et al., 2018
- ....
SES gradations in CDS & language outcomes all over the world

Snow et al., 1976; Schady et al., 2015; Kim, Kim, & Do, 2018; Dwyer et al., 2018; etc.
SES gradations in CDS & language outcomes all over the world

SES is not an individual-level variable

Snow et al., 1976; Schady et al., 2015; Kim, Kim, & Do, 2018; Dwyer et al., 2018; etc.
inadequate healthcare

reminders of scarce resources

underfunded public schools

housing insecurity

over-policing

food insecurity and poor health and sleep

inadequate healthcare

discrimination

struggling family members
inadequate healthcare

reminders of scarce resources

housing insecurity

underfunded public schools

over-policing

struggling family members

inadequate healthcare

food insecurity and poor health and sleep
Food insecurity and poor health and sleep lead to reminders of scarce resources. Scarcity of resources is a reminder of inadequate healthcare. Over-policing and lack of physical safety lead to underfunded public schools. Struggling family members are reminded of discrimination. Discrimination leads to housing insecurity.
food insecurity and poor health and sleep

inadequate healthcare

discrimination

reminders of scarce resources

housing insecurity

underfunded public schools

over-policing and lack of physical safety

struggling family members

Mani et al., 2013
Do structural aspects of low-SES contribute to the word gap?

Study 1

Study 2
Study 1

- discrimination
- reminders of scarce resources
- inadequate healthcare
- food insecurity and poor health and sleep
- struggling family members
- over-policing and lack of physical safety
- underfunded public schools
- housing insecurity
Study 1

- housing insecurity
- underfunded public schools
- over-policing and lack of physical safety
- discrimination
- reminders of scarce resources
- inadequate healthcare
- food insecurity and poor health and sleep
- struggling family members
Study 1

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- Food insecurity and poor health and sleep
- Inadequate healthcare
- Reminders of scarce resources
- Housing insecurity
- Underfunded public schools
- Over-policing and lack of physical safety
- Struggling family members
Study 1

Participants: higher-SES parents and their 3-year-olds
Randomly assigned to Scarcity or Control condition
Study 1

Parent fills out scarcity induction survey
Study 1

Parent fills out scarcity induction survey

Child completes unrelated experiment with experimenter
Study 1

Experimenter leaves the room under guise of loading survey onto iPad
At the last minute, “remembers” there is a toy in the cabinet the child can play with while they wait.
Study 1

Experimenter leaves the room for 10 minutes
After 10 minutes, experimenter returns and debriefs parent.
• n = 100 higher-SES 3 year-olds and their parents
  • 16 excluded: leaving the room less than 5 minutes into the play session; having more than one person in the room; not filling out the manipulation survey correctly; child fussed out of experiment...
  • final sample: 84

• conditions matched on age, SES, parent gender, etc.

• pre-registered analysis plan
Study 1

quantity & quality of child-directed speech

reminders of scarce resources

reminders of things they did in the last week
Study 1

Quantity of CDS

Parent word tokens

Parent word types

Condition
- Scarcity
- Control

Scarcity
Control
Study 1: Quantity of CDS

**p = 0.11**

Parent word tokens

Parent word types

Condition
- Scarcity
- Control

Scarcity | Control
Study 1: Quantity of CDS

- Parent word tokens: $p = 0.11$
- Parent word types: $p = 0.07$

[Graphs showing box plots for Quantity of CDS under Scarcity and Control conditions.]

Reminders of scarce resources
Study 1

Scarce money

Parent word tokens

Parent word types

Condition
- Scarcity
- Control
Study 1

Scarce money

Parent word tokens

No finances
Finances
Control

p = 0.021

Parent word types

Condition
Scarcity
Control

Condition
No finances
Finances
Control
Study 1

Scarce money

Parent word tokens

Parent word types

Condition
- Scarcity
- Control

p = 0.021

p = 0.007

p = 0.110

p = 0.048

No finances

Finances

Control

No finances

Finances

Control
Study 1

Reminders of scarce resources

Conclusions
Study 1

Conclusions

reminders of scarce resources

$\text{reminders of scarce resources}$
food insecurity and poor health and sleep

inadequate healthcare

underfunded public schools

over-policing and lack of physical safety

discrimination

housing insecurity

reminders of scarce resources

struggling family members
food insecurity and poor health and sleep

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underfunded public schools

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housing insecurity

discrimination

struggling family members
Study 2
Study 2

- housing insecurity
- reminders of scarce resources
- food insecurity and poor health and sleep
- struggling family members
Study 2

- housing insecurity
- food insecurity and poor health and sleep
- reminders of scarce resources
- struggling family members
Study 2

housing insecurity

reminders of scarce resources

food insecurity and poor health and sleep

struggling family members
Study 2

Pew Research Center, 2016

Carvalho, Meler, & Wang, 2016; Pires & Salvo, 2015
Study 2
Study 2

automatically quantify:
AWC rate (adult words)
CVC rate (child vocalizations)
CTC rate (conversational turns)
**Study 2**

192 participants, 1053 datapoints

**Site 1:** Bergelson (n=44, 87 recordings)
- ages 6-7m

**Site 2:** Cougar (n=93, 782 recordings)
- ages 0-90m

**Site 3:** Warlaumont (n=55, 174 recordings)
- ages 2-26m

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Study 2

Predictions
Study 2 Predictions
Study 2 Predictions
Study 2

Predictions

[Diagram showing conversational turns and day of month]
Study 2

Predictions

Conversational turns

Day of month
Study 2

Predictions

Day of month

Conversational turns

Bergelson
Cougar
Warlaumont

AWC
CVC
CTC

CVC

AWC

%&*%#@
How do speech patterns compare to usual during the last week of the month?
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<table>
<thead>
<tr>
<th>Corpus Type</th>
<th>warlaumot</th>
<th>cougar</th>
<th>bergelson</th>
<th>all</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTC</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>CTC (ctrl AWC)</td>
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<tr>
<td>CTC (ctrl CVC)</td>
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<tr>
<td>CVC</td>
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</tr>
</tbody>
</table>

![Graph showing speech patterns comparison](image_url)
How do speech patterns compare to usual during the last week of the month?
How do speech patterns compare to usual during the last week of the month?

5% of average

8% of average
How do speech patterns compare to usual during the last week of the month?

- 5% of average
- 40 fewer CTCs/day
- 280 fewer during that week
- 8% of average
Parameter estimates across all corpora
Parameter estimates across all corpora

Day of month

Conversational turns (prediction)

first paycheck
Parameter estimates across all corpora

![Graph showing conversational turns over day of the month, with a horizontal line indicating the first paycheck.](image)
Parameter estimates across all corpora

- First paycheck
- Second paycheck

Conversational turns (prediction) vs. Day of month
Parameter estimates across all corpora

Day of month

Conversational turns (prediction)

first paycheck
second paycheck
Study 2 Conclusions

Pew Research Center, 2016
Study 2 Conclusions

Pew Research Center, 2016
Study 2

Conclusions

Pew Research Center, 2016
food insecurity and poor health and sleep
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THANK YOU

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